

CLAIMS

What is claimed is:

1. A Tx line driver with a common mode idle state and selectable slew rates, comprising:

- a pre-driver module for producing a differential input data stream, the pre-driver coupled to a supply voltage;

- a differential line driver module further including a pair of devices coupled to receive the differential input data stream at a line driver differential input;

- a capacitor array further including at least one capacitor coupled to each input of the line driver differential input;

- a selectable switch coupled to provide a bias signal to the pre-driver circuit wherein the pre-driver circuit produces an output voltage that is equal to the supply voltage when the bias signal is removed by the selectable switch; and

- circuitry for producing:

- during an idle state, an idle state signal to select switch position to remove the bias signal to the pre-driver module; and

- during an operational state (non-idle state), a bias signal to couple at least one selectable capacitor of the capacitor array to each input of the differential inputs to set a specified slew rate.

2. The Tx line driver of claim 1 wherein the circuitry, during an idle state, generates an idle state signal to open a connection to a line providing the bias signal to the pre-driver module.

3. The Tx line driver of claim 1 wherein the pre-driver module comprises a differential input pair that turn off when the idle state signal is produced by the circuitry wherein an

output voltage floats to the supply voltage responsive to the differential input pair being turned off.

4. The Tx line driver of claim 1 wherein the circuitry, during an operational state, selects the at least one capacitor coupled to each input of the differential inputs to select a slew rate that correspond with a specified data rate.

5. The Tx line driver of claim 4 wherein the capacitors comprise capacitor configured MOSFETs.

6. The Tx line driver of claim 4 wherein the at least one capacitor is coupled in series with a selectable switch that provides a connection to ground responsive to receiving a slew rate logic signal.

7. The Tx line driver of claim 5 wherein circuitry generates at least two bias signals to select at least two capacitors to reduce a slew rate from a first value to a second value.

8. The Tx line driver of claim 5 wherein the circuitry generates at least four bias signals to select at least four capacitors wherein each of two inputs of the differential input is coupled to a pair of selectable capacitors.

9. A Tx line driver with a common mode idle state, comprising:

- a pre-driver module for producing a differential input data stream, the pre-driver module coupled to a supply voltage;

- a differential line driver module further including a pair of devices coupled to receive the differential input data stream at a line driver differential input wherein the differential line driver module produces an output data

stream characterized by a specified signal magnitude;

a selectable switch coupled to provide a bias signal to the pre-driver module wherein the pre-driver module produces an output voltage that is equal to the supply voltage when the bias signal is removed by the selectable switch;

circuitry for selecting a switch position to remove the bias signal to the pre-driver module; and

wherein, when the pair of devices of the differential line driver module receive a signal at the same time from the pre-driver module, the pair of devices of the differential line driver module produce an output equal to one half of the specified signal magnitude.

10. The Tx line driver of claim 9 wherein the circuitry, during an idle state, generates an idle state signal to open a connection to a line providing the bias signal to the pre-driver module.

11. The Tx line driver of claim 9 wherein the pre-driver module comprises a differential input pair that turn off when the idle state signal is produced by the circuitry wherein an output voltage floats to the supply voltage responsive to the differential input pair being turned off.

12. A Tx line driver with a common mode idle state, comprising:

a pre-driver module for producing an input data stream, the pre-driver module coupled to a supply;

a differential line driver module coupled to receive the input data stream at a differential input;

a selectable switch coupled to provide a bias signal to the pre-driver module wherein the pre-driver module produces an output voltage that is equal to the supply voltage when the bias signal is removed by the selectable switch; and

logic for setting an idle state indication wherein the idle state indication selects a switch position to remove the

bias signal to the pre-driver module to provide a supply voltage to each of two inputs of the differential line driver module wherein the differential line driver module provides common mode level output level upon receiving the supply voltage at each of the two inputs.

13. The Tx line driver of claim 12 wherein:

the pre-driver module includes a first differential pair with first and second drains and a first current mirror stage; and

the differential line driver module includes a second differential pair and a second current mirror stage, the second differential pair having first and second gates coupled to the first and second drains, respectively, of the first differential pair, wherein the first and second current mirror stages provide bias signals to the first and second differential pairs of the pre-driver module and the differential line driver module, respectively.

14. The Tx line driver of claim 13 wherein a selectable switch is coupled to a gate of a MOSFET forming the first current mirror stage and wherein the logic for setting an idle state indication opens the selectable switch to bias both devices the first differential pair into an off state to cause the drains of the first differential pair to go to the supply voltage.

15. The Tx line driver of claim 14 wherein, responsive to the drains of the first differential pair being at supply, the MOSFET devices of the second differential pair are both biased to an on state to provide a selected common mode level.

16. A Tx line driver with selectable slew rates, comprising:  
a pre-driver module for producing an input data stream,  
the pre-driver module coupled to a supply;

a differential line driver module further including a pair of devices coupled to receive the input data stream at a line driver differential input;

at least one selectable capacitor of a capacitor array coupled to each input of the line driver differential input; and

logic for selecting, during an operational state (non-idle state), the at least one selectable capacitor coupled to each input of the line driver differential input to set a specified slew rate.

17. The Tx line driver of claim 16 wherein the logic selects the at least one capacitor to correspond with a specified data rate.

18. The Tx line driver of claim 17 wherein the logic generates at least one bias signal to bias at least one capacitor configured MOSFET into an operational mode.

19. The Tx line driver of claim 17 wherein the at least one capacitor is coupled in series with a switch that provides a connection to a current mirror responsive to receiving a bias signal.

20. The Tx line driver of claim 18 wherein the logic generates at least two bias signals to select at least two capacitors wherein each of two inputs of the differential input is coupled to a selectable capacitor.

21. The Tx line driver of claim 18 wherein the logic generates at least four bias signals to select at least four capacitors wherein each of two inputs of the differential input is coupled to a pair of selectable capacitors.

22. A programmable Tx line driver, comprising:  
a pre-driver module for producing an input data stream,

the pre-driver circuit coupled to a supply;

a differential line driver module further including a pair of devices coupled to receive the input data stream at a line driver differential input;

means for adjusting a slew rate; and

logic means for selecting the slew rate.

23. The programmable Tx line driver of claim 22 wherein the means for adjusting the slew rate comprises a plurality of selectable capacitors.

24. The programmable Tx line driver of claim 22 wherein the means for adjusting the slew rate comprises a plurality of selectable capacitor configured MOSFETs.

25. The programmable Tx line driver of claim 22 further including means for producing a common idle mode state.

26. The programmable Tx line driver of claim 25 wherein the means for producing the common idle mode state further includes switching means for removing a bias signal to the pre-driver module to prompt the pre-driver module to produce an output approximately equal to a source voltage.

27. A method for producing a common mode idle state and for adjusting a slew rate for a data stream in a Tx line driver, comprising:

determining whether the Tx line driver is in one of an idle state or in an operational state;

if the Tx line driver is in an idle state, producing an idle state mode signal to a switch and removing a bias signal from a pre-driver module and producing a common mode idle state output from the Tx line driver; and

if the Tx line driver is in an operational state, producing a slew rate selection signal to a capacitor bank to select at least one capacitor of a plurality of capacitors

within the capacitor bank to couple the at least one capacitor between a Tx line driver input and ground, wherein the selected at least one capacitor establishes a slew rate for the Tx line driver.

28. The method of claim 27 wherein the step of selecting at least one capacitor further includes selecting at least one capacitor for each of two inputs of a pair of differential inputs of the Tx line driver.

29. The method of claim 27 wherein the step of selecting at least one capacitor further includes selecting at least two capacitors for each of two inputs of a pair of differential inputs of the Tx line driver.